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"VETERINARY JOURNAL."

By Members of the Staff of the Veterinary School, Melbourne University, Australia.

WHAT HAS THE VETERINARY PROFESSION DONE FOR AUSTRALIA?

Notwithstanding the long-delayed recognition of the services of veterinary surgeons to the stock-owning and general public it must be admitted that, especially during the last twenty-five years, our profession has put up a grand record in Australia. The veterinary inspection of all imported stock has prevented the introduction of any new diseases. The importance of this inspection is well exemplified in the detection by Mr. Edward Stanley, F.R.C.V.S., of glanders in a troop of circus horses that had been brought over from America. The affected horses were immediately destroyed, and the rest quarantined effectively on an island, and the disease prevented from entering the State.

The early diagnosis of pleuro-pneumonia by the late Mr. Henry Wragge, and the strong warning by him against allowing the disease to spread—though his warning was not observed—is worthy of permanent record.

The recognition of an outbreak of foot and mouth disease by the late Mr. Graham Mitchell, in 1872, and the immediate destruction of the affected herd, effectually arrested further spreading of the disease, and the amount thus saved to the country is incalculable. Mr. Mitchell also introduced and extensively practised inoculation for the protection of pleuro-pneumonia. He also, assisted by the writer, commenced the cultivation of calf lymph for the vaccination of children, which is still carried on at the Royal Park depot.

After receiving instruction from Pasteur's representatives, Messrs. Germont and Loir, who came out to New South Wales to introduce vaccination against anthrax, I commenced the cultivation of tubercle-free pleuro virus on calves, and continued to use it and supply it to stock-owners for several years, with the result that pleuro-pneumonia was practically stamped out of the herds of Victoria, and the possibility of tuberculosis being spread by means of tainted pleuro virus greatly reduced.

By obtaining the Veterinary Surgeons Act, and providing for the registration of all qualified veterinary surgeons, stock-owners could

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protect themselves from the imposition of unqualified practitioners, while the establishment of a veterinary college has been the means of saving the lives of thousands of valuable animals and much wealth to the community.

The introduction of tuberculin testing for tuberculosis in cattle, and its frequent use by members of the profession in detecting the disease in its most latent forms, has led to an enormous reduction in the prevalence of that disease in cattle, and indirectly of that of many human beings.

Inoculation for the prevention of blackleg in calves has been the means of preventing much loss to dairymen from that disease.

The general outbreak of swine fever in 1901 was practically stamped out in Victoria in three months, through every qualified veterinary surgeon in the State being appointed an inspector, and acting under my instructions.

Original Communications.

NOTES ON THE EARLY HISTORY OF THE VETERINARY PROFESSION IN VICTORIA.*

By W. TYSON KENDALL, D.V.Sc.. H.A.R.C.V.S., M.R.C.V.S.

First Attempt to Secure State Veterinary School.

In 1882 the Veterinary Association succeeded in obtaining, through the then Minister of Lands, the Hon. Walter Madden, a small piece of land in the old police paddock at Richmond, as a site for a Veterinary School or College. Although the site was much too small for the purpose, we were glad to get it, in the hope that we might be able to exchange it at some future date for a more suitable one. In this, however, we were disappointed. When it was found that we had made no use of it, and being further influenced by a deputation of Richmond residents who objected to a veterinary college being established in their midst, the Government cancelled the grant. It will be of interest to relate that Mr. G. Mitchell had, on his own initiative, instructed an architect to draw plans of the proposed college, and the Veterinary Association was served with an account for plans and specifications. The association, having had no say in the matter, denied liability; thereupon Mr. Mitchell was personally sued for the amount, and was ordered by the Court to pay the amount and costs. This broke up the association, and some years elapsed before another was formed.

In consequence of representations I had made through the Press

* Continued from page 37, Australian Supplement in October, 1916, issue of Veterinary Journal.

as to the great prevalence of tuberculosis amongst cattle slaughtered for human consumption, and demonstrations made before the officers of the stock department, the matter was brought before the Upper Chamber by the late Hon. James Buchanan, of Berwick, and a Royal Commission was appointed to enquire into it. A voluminous report of the evidence taken was published, together with numerous photographs of meat affected with different stages of the disease. As an outcome of this, a staff of inspectors was appointed to inspect at the abattoirs and markets, and it was also decided to appoint a qualified veterinary surgeon to inspect the City Abattoirs and take statistics of the number of diseased animals slaughtered, and the diseases, etc. Unfortunately, no suitable applicant turned up, and the appointment was never made.

During the next few years the profession in Melbourne received some additions, viz., Messrs. Goule, Cohen, Wragge, and Sharp. all of whom settled here. This accession led to the formation of another Veterinary Association, which immediately took up the question of framing a Veterinary Surgeons Bill, to enable stock-owners to distinguish between qualified and unqualified men, and to protect the interests of the profession. This Bill was based chiefly on the then existing English Veterinary Surgeons Act, and, as secretary of the association, it fell to the writer's lot to make the rough draft. The Bill was brought before Parliament by the late Mr. Bosisto, M.P., and passed after receiving some additions at his hands from the Pharmacy Act, and further changes in the Upper House, particularly the introduction of a most important clause, at the instance of the late Hon. Dr. Beaney, providing for a four years' course.

Establishment of the Veterinary College.

Owing to a promise being made to Mr. Bosisto that, in the event of the Veterinary Surgeons Bill being passed, an early attempt would be made to establish a Veterinary College, and receiving no help from the Government in regard to providing a suitable site or funds to erect the necessary buildings, as well as lack of interest in the matters displayed by my colleagues, I determined to try what I could do single-handed.

The first step was to obtain the signatures of all the leading horse-owners, stock and station agents, medical men, and others in Melbourne, to a requisition to the City Council praying that a college might be erected on the market reserve adjoining the Horse Market, Sydney Road, Parvkille, being part of the reserve on which the new University Veterinary School now stands.

The requsition was signed by a large number of people, and duly presented to the City Council, who received it very favourably, and

submitted it to the legislative committee to be dealt with. Unfortunately, it was discovered that they held the land in trust for market purposes only, and without special legislation it could not be used for any other purpose.

This scheme was, therefore, abandoned; but, having been assured by some of the leading members of the Government that if it could be shown that such an institution was a necessity, and students forthcoming, assistance would be given, I determined to establish a private college. In 1885 I had purchased the site of the old college, and immediately opened a veterinary hospital. Not, however, without considerable difficulty was it established. Owners of sick animals had not been accustomed to send them to a hospital for treatment, and for the first year I found it necessary to buy the patients in many instances, and sell them, at a good profit, either to the original owner or someone else. Nevertheless, in a couple of years it was no unusual thing to have thirty or forty patients in at a time.

In 1886 the college buildings were erected, but the institution was not opened for teaching purposes till January, 1888. A curriculum was arranged in accordance with the regulations of the Act, and Mr. E. Rivett, M.R.C.V.S., and Dr. Joyce, having been engaged to assist in teaching, classes were opened and six students entered. The teaching staff was added to as the necessity arose. Amongst the new additions were Mr. C. Vyner, M.R.C.V.S., Mr. S. S. Cameron, M.R.C.V.S., and Professor McBride, Ph.D., M.R.C.V.S., and Mr. A. Goule, M.R.C.V.S. During the first year, students attended the College of Pharmacy for chemistry and materia medica; but, in consequence of Professor Jackson severing his connection with that institution and afterwards engaging to teach at the Veterinary College, a libellous article appeared in the *Pharmaceutical Journal* depreciating the latter institution, and this led to an action at law, and the Pharmaceutical Society was mulcted in damages to the extent of £416 and costs. This action was an important event in the history of the College, and was rendered necessary on account of the fact that the Veterinary Board had withdrawn its recognition of the teaching, and refused to appoint examiners to examine the students in consequence of the article referred to. The effect of the verdict on the Veterinary Board was electrical. At its next meeting, a resolution was passed recognising the teaching, and it was decided to appoint an Examining Board.

After that things went more smoothly for a time. It would occupy too much time to relate the many ups and downs of the old college. Suffice it to say that the Veterinary Board always obtained the best available examiners, often seeking aid from Sydney, and that,

from the first, a high standard of efficiency was insisted upon, with the result that graduates have established a status for the profession that many countries might envy.

Another event—which occurred in 1891, and caused a considerable amount of anxiety for a time—was an effort on the part of an association formed by a section of the profession to obtain a site and funds to establish a State Veterinary School. The Association so far succeeded as to obtain a site at Spotswood, and negotiations were opened with me in order to have the teaching transferred to the proposed State Institution. As the site was a most inconvenient and unsuitable one, I strongly opposed it, feeling certain that failure would be sure to follow if such a transference took place. The scheme was abandoned, and it was hoped that a better site would have been substituted; but nothing further was accomplished till the City Council generously granted the site of the present University Veterinary School, in Parkville, and at the instance of the Hon. George Swinburne, then Minister of Agriculture, the Government provided the necessary funds to build and maintain the new institution. To Dr. Cameron is due the credit of inducing the Minister to make the grant.

So, after struggling on for twenty years, the old college gave place to the new school, and a new regime under the University Council is now in full operation.

During the old regime two applications were made to obtain affiliation with the Royal College of Veterinary Surgeons, the first by myself, as principal of the College, in 1896, and the second by the Veterinary Board, in 1898, and in both instances the reply was that the only bar to this recognition was the absence of a matriculation examination, which had not been provided for in the Veterinary Surgeons Act of Victoria.

The function of the Veterinary Board has been to administer the Act, and its main duties have been to appoint examiners to examine the students, to register graduates of recognised veterinary schools and colleges, and practitioners who had practised as veterinary surgeons for seven years immediately preceding the passing of the Act, and also to prosecute persons infringing any of the provisions of the Act.

The disclosures in reference to the large numbers of diseased animals slaughtered at the various abattoirs led to inspection of the principal slaughterhouses, and more recently the Meat and Dairy Supervision Acts, for which the late Dr. Creswell, Chairman of the Board of Health, and Dr. Cameron were responsible, has been of the utmost value in securing a wholesome food supply for the people and also for export.

The establishment of both Commonwealth and State Veterinary

Departments has been the means of getting all the most serious animal diseases under control, of educating stock-owners to the necessity of keeping their flocks and herds free from disease, and by adopting the system of inspecting and certifying to the soundness of stallions, the soundness and stamina of our horses is being gradually improved.

Australian graduated veterinary surgeons now occupy important Government and other public positions in every state in the Commonwealth as well as in New Zealand, the Straits Settlements, and in London. A large number are doing good work in private practice and there is a continual demand for good men in both private and public positions.

During the Boer war some fifteen or sixteen were on active service for the Imperial Government, and were highly appreciated by the Imperial officers, some being retained after the war was over.

The establishment of a University Veterinary School and Veterinary Research Institute are matters of more recent date.

As may be imagined, the question of dealing with applications for registration of men alleged to have practised during the prescribed period has been a frequent source of trouble, and sometimes of expensive litigation. But, on the whole, the Board has carried out its duties fearlessly, both in regard to refusing registration to applicants whom it considered ineligible, and in prosecuting persons for illegally practising, and the members of the profession, in spite of occasional grumbling about unregistered persons practising, are well protected in Victoria, and stock-owners, on the other hand, need not be imposed upon by unqualified men. It is gratifying to know that the other States are following Victoria's example, and it is to be hoped that ere long there will be uniform legislation, or something approaching it, throughout the whole Commonwealth.

THE VIABILITY OF *MELOPHAGUS OVINUS* LINN., THE SHEEP LOUSE-FLY, SHEEP KED, OR SHEEP-"TICK."

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In view of the very considerable differences which exist in Australia, it has been the desire of the authors for some time to test, for the purpose of confirmation or otherwise, the currently accepted statements with regard to the conditions determining the life histories and the effects of animal parasites. The truth or otherwise of these statements under Australian conditions obviously influences the value of the Government regulations for the extermination of these parasites or for prevention, based on these statements of what takes

place under the conditions found in the several parts of the Northern Hemisphere. However, chiefly owing to war conditions and the claims of other duties, the opportunity and suitable material have not been forthcoming at the same time. One of these parasites, of some importance in a sheep-raising country such as Australia, is *Melophagus ovinus* Linn., the special point requiring earliest determination being the length of time during which the parasite may remain alive off the animal and without food.

Late in November of this year (1916) some unshorn sheep obtained for use in other experiments were found to have a considerable number of these louse-flies in the fleece, and the experiments herein recorded were carried out.

The first intention was to do three parallel sets of experiments—one now, at the beginning of a summer which has so far been very wet and mild; another early in February, when hot, dry condition may be expected to prevail; and in midwinter, when wet and cold. In this way it was hoped to test them under all the possibilities of varying conditions. However, this first set has proved so interesting, and so emphasised the truth of the opening remarks of this communication, that we have thought it desirable not to wait for the conclusion of the three sets of experiments before publishing the results of this.

In the literature on the subject available to us here, the only records of definite experiments on this point which we have been able to find are those of Curtice[1] and Swingle.[2] In the former (1, page 41), "a dozen or more of these ticks, which were moderately well fed when taken from the sheep, were, with some wool, placed in a cotton-stoppered bottle and kept in a room with a temperature varying between 60° and 80° F. They all died in *less than four days* (the italics are ours). The leanest succumbed first, in about two days, while those that were better nourished gradually grew smaller and thinner, and lived little longer than the third day. Others, placed in wool over the damp soil of a geranium in a flower pot, died *within four days*. On the other hand, some young ones which were hatched out in a bottle were kept for nearly two weeks, or *until their daily feeding was neglected*. To feed them they were placed on the back of my hand." Swingle's "experiments on keeping ticks in boxes covered with gauze show that the sheep-tick's life off the sheep is very short. They were *all dead in four days* whether they were kept warm or cool. Young ticks before taking a meal can be kept a little longer, and in one case, years ago, the writer was able to keep a tick alive off the sheep *for seven days*. A large percentage of them will die within 48 ours" (2, page 22). He then records two experiments in which a total

of 283 ticks were all dead within four days. He concludes that "it is a false idea that the tick may drop the sheep and live for a long time in the grass or brush, and be picked up again by sheep, as is the case with the true tick." It will be noted that the conditions under which a "tick" was kept alive off the sheep for seven days are not given, but it would appear to be a young unfed "tick."

Various text-books and other publications refer more or less vaguely to the short time of life possible off the sheep, some quoting under four days: Herms[3] remarks further (3, page 294) that "when off the sheep the insects die in from two to eight days, most of them dying in about four days."

There is, however, in none of these cases, any indication on whose authority or on what evidence the statement is based, other than one or two instances referring to Curtice's and Swingle's work. We have been unable to find any record of experiments reaching to eight days of life off the sheep.

Details of our Experiments.

(1) *Conditions under which the "Ticks" were kept.*

A. *Receptacles.* The following places were prepared:—

I and II.—Sod of lawn grass in an open petri dish 14 cms. diameter with a glass chimney 6·4 cms. high and 6·2 cms. wide, firmly embedded in the centre of the grass. The grass was 2 to 4 cms. high. That portion of the sod outside the chimney was kept well moist, the water simply soaking into the enclosed portion.

III and IV.—Soil in open petri dish (provided with chimney as in I and II), well flattened down, and a quantity of leaves (dead) placed on surface. The soil was clayey loam, and would be about 2 cms. deep. The leaves were from $\frac{3}{4}$ in. to $1\frac{1}{2}$ ins. long.

V and VI.—Same as III and IV, but with no leaves. The soil in VI was drier than in V, and the parasites soon became covered with dust.

VII and VIII.—Large open petri dish, 14 cms. in diameter, containing wool.

B. *Location of Receptacles.*

I, IV, VI and VIII were placed in a cellar partially lighted from the exterior.

II, III and V were placed in the quadrangle of the Institute on the lawn; this is surrounded by a one-storey building, except on part of the west side, where it rises to the height of a two-storeyed building. The receptacles were placed near the centre of the enclosed lawn. In this situation they were fairly well protected from any cold west winds, but they were fully exposed to any warm north wind. The receptacles were kept in the sunshine as much as possible. When the weather was showery a small table was placed over them to

protect them, and during the night, as the weather was unsettled most of the time, they were placed under a very low table in order that the rain should not beat in on them. At the same time they were freely exposed to the cold during the night.

VII was placed near the window on the bench in the laboratory facing the south.

C. *Climatic Conditions.*

The weather during the experiments was very unsettled. Rain, warm, north wind, cold S.S.W. winds, cool nights, thunderstorms, and warm, sunny days were all experienced during the experiment.

The following is a brief record of the weather each day:—

December 4th, 1916. Day fine, broken clouds and a light south to south-east wind.

„ 5th. Fairly heavy rain during the night, followed by a showery day. 6th. Day fine.

„ 7th. Strong northerly wind; day warm.

„ 8th. Day warm and humid, variable winds, chiefly northerly, and steady showers with some thunder.

„ 9th. Rain during the night. Day fine with moderate temperature, but rather sultry and at times cloudy.

„ 10th. Day fine but sultry.

„ 11th. Morning fine but sultry and threatening; afternoon wet and thundery with variable winds.

„ 12th. Day on the whole was fine, though cloudy at times. Little rain in afternoon when wind shifted to S-W.

„ 13th. Day fine. 14th. Day fine; cool. 15th. Day fine.

The readings were as follows:—

Date of Reading.	Cellar.		Lawn.		Laboratory Bench.	
	Max.	Min.	Max.	Min.	Max.	Min.
5–12–16	*61°	59°	*83°	50°	*68°	59°
6–12–16	60°	58°	82°	50°	63°	59°
7–12–16	60°	59°	91°	53°	70°	61°
8–12–16	72°	61°	96°	59°	80°	69°
9–12–16	64°	62°	80°	54°	74°	64°
10–12–16	62°	60°	86°	55°	76°	64°
11–12–16	62·5°	61·5°	90°	56°	76°	68°
12–12–16	68°	60°	98°	48°	78°	62°
13–12–16	62°	60°	88°	50°	74°	62°
14–12–16	62°	58°	88°	54°	68°	60°
15–12–16	60°	58°	88°	54°	66°	60°

* These temperatures were the maxima for 17 hours—*i.e.*, since experiment was commenced.

Self-registering thermometers placed in each of the situations

with the parasites were read daily at 9 a.m., and gave the maximum and minimum (Fahr.) during the previous twenty-four hours.

(2) *Selection and Distribution of Parasites.*

In all 151 parasites were collected from these lambs and at 4 p.m., December 4th, divided as follows :—

I, II, III, IV, V, VI, twenty parasites each. VII, sixteen parasites. VIII, fifteen parasites.

The parasites were taken indiscriminately from the sheep, but in distributing them care was taken to see that they had not been badly damaged in collection, that each was full of vigour, and that parasites of approximately the same size were placed in each. It was estimated that in each ten there were two distinctly small ones.

(3) *Periodical Counting of the Parasites.*

The parasites were distributed at 4 p.m. on December 4th, and were carefully counted at 10 a.m. each morning following, and after three days also at 4 p.m. in the afternoon. On each occasion any dead parasites were removed. The following is the record of the numbers living and dead after each morning's counting. The missing are retained in the daily tally ; the dead are not. The number in " D " column represents the number which have died since the last count was made.

The following table gives the percentage of *viable* parasites in each receptacle throughout the experiment. It is admitted that the numbef of parasites in each is very few on which to base percentages ; but, as will be seen, the figures for parasites kept under similar conditions approximate very closely. For this table the missing parasites are counted as dead.

Time. Hours.	I	II	III	IV	V	VI	VII	VIII	Total.
18	100·0	95·0	95·0	100·0	100·0	100·0	100·0	93·3	98·0
42	100·0	95·0	90·0	100·0	25·0	100·0	37·5	80·0	92·6
66	100·0	65·0	0·0	95·0	0·0	100·0	25·0	26·6	52·9
90	90·0	25·0	—	90·0	—	95·0	0·0	6·6	40·0
(4 days) 96	90·0	20·0	—	80·0	—	90·0	—	0·0	36·9
104	75·0	20·0	—	80·0	—	70·0	—	—	32·3
(5 days) 120	75·0	10·0	—	80·0	—	70·0	—	—	38·9
138	40·0	0·0	—	60·0	—	70·0	—	—	22·4
(6 days) 144	30·0	—	—	55·0	—	65·0	—	—	19·7
162	0·0	—	—	40·0	—	45·0	—	—	11·2
(7 days) 168	—	—	—	35·0	—	40·0	—	—	9·9
186	—	—	—	35·0	—	20·0	—	—	7·2
(8 days) 192	—	—	—	35·0	—	20·0	—	—	7·2
210	—	—	—	30·0	—	5·0	—	—	4·6
(9 days) 216	—	—	—	25·0	—	5·0	—	—	3·9
233	—	—	—	15·0	—	5·0	—	—	2·6
(10 days) 240	—	—	—	5·0	—	5·0	—	—	1·3
257	—	—	—	5·0	—	5·0	—	—	1·3
(11 days) 264	—	—	—	0·0	—	0·0	—	—	0·0

Influence of Apparent State of Nutrition on the Viability of the Parasite.

It was quite noticeable that, although a certain amount of shrivelling took place, this was not at all marked, and moreover the two last survivors when seen from below, even when dead, were far from being shrunken, though on the dorsal surface of the abdomen a slight shrinkage was evident. Moreover, some of those which looked quite shrivelled to begin with, and seemed almost dead then, survived quite a time. This is in clear contrast to the observations of Cooper Curtice, who states "the leanest succumbed first in about two days, while those that were better nourished gradually grew smaller and thinner, and lived little longer than the third day."

Influence of Sex on Viability.

Unfortunately, the importance of this point was not realised till too late in this experiment to be of much use, but it is worthy of record that the last surviving ticks were males. It is proposed to make careful records in this respect in the next series of experiments.

Viability of Pupæ.

Observations are in progress on this matter and will be incorporated in a later report.

Summary of Experiments.

In view of the fact that in the previously recorded experiments in the Northern Hemisphere nearly all the parasites were dead within four days, it is interesting to compare the results obtained here. It will be seen on reference to the last tables that all the parasites in III (leaves on the lawn) and in V (bare soil on lawn) were dead in 66 hours; those in VII (wool on laboratory bench) were dead in 90 hours; those in VIII (wool in the cellar) were dead in 96 hours (four days); leaving, however, 36·9 per cent. of the original number still alive in I, II, IV, and VI.

Of these four, 80 or 90 per cent. were alive except in II (grass on lawn), in which only 20 per cent. remained viable. Evidently therefore some markedly favourable condition or conditions were present in these, especially in I, IV, and VI.

The next location in which all the parasites succumbed was II (grass on lawn), all being dead at 138 hours ($5\frac{3}{4}$ days). These were followed by I (grass in cellar), in which all were dead 24 hours later ($6\frac{3}{4}$ days). It is to be noted that at this period, 40 per cent. of the parasites in IV (leaves in cellar), and 45 per cent. of those in VI (bare soil in cellar) were still alive; at the end of 210 hours ($8\frac{3}{4}$ days) it will be seen that six parasites (30 per cent.) were alive in IV, but only one parasite (5 per cent.) was still alive in VI. Those in IV gradually died off till at the end of 240 hours (10 days) there was only one alive

VIABILITY OF MELOPHAGUS.

Date.	Hour.	Period of Experiment in hours.	I. Grass in Cellar.			II. Grass on Lawn.			III. Leaves on Lawn.			IV. Leaves in Cellar.			V. Soil on Lawn.			VI. Soil in Cellar.			VII. Wool in Laboratory.			VIII. Wool in Cellar.			Total.		
			L.	M.	D.	L.	M.	D.	L.	M.	D.	L.	M.	D.	L.	M.	D.	L.	M.	D.	L.	M.	D.	L.	M.	D.	L.	M.	D.
4–12–16	4 p.m.	0	20	–	–	20	–	–	20	–	–	20	–	–	20	–	–	20	–	–	16	–	–	15	–	–	151	–	–
5–12–16	10 a.m.	18	20	–	–	19	1[1]	–	19	–	1	20	–	–	20	–	–	20	–	–	16	–	–	14	–	1	148	1	2
6–12–16	10 a.m.	42	20	–	–	19	1[1]	–	18	–	1	20	–	–	5	–	15	20	–	–	6	–	10	12	–	2	140	1	28
7–12–16	10 a.m.	66	20	–	–	13	–	7	0	1[3]	17	18	–	1	0	–	5	20	–	–	4	–	2	4	–	8	80	1	40
8–12–16	10 a.m.	90	18	–	2	5	2[2]	6	–	–	–	18	–	1	–	–	–	19	–	1	0	–	4	1	–	3	61	3	17
8–12–16	4 p.m.	96	18	–	–	4	1	2	–	–	–	16	–	2	–	–	–	18	–	1	–	–	–	0	–	1	56	2	6
9–12–16	10 a.m.	114	15	–	3	4	1[3]	–	–	–	–	16	–	–	–	–	–	14	–	4	–	–	–	–	–	–	49	2	7
9–12–16	4 p.m.	120	15	–	–	2	1[3]	2	–	–	–	16	–	–	–	–	–	14	–	–	–	–	–	–	–	–	47	2	2
10–12–16	10 a.m.	138	8	–	7	0	1[3]	2	–	–	–	12	–	4	–	–	–	14	–	–	–	–	–	–	–	–	34	2	13
10–12–16	4 p.m.	144	6	–	2	–	–	–	–	–	–	11	–	1	–	–	–	13	–	1	–	–	–	–	–	–	30	2	4
11–12–16	10 a.m.	162	0	–	6	–	–	–	–	–	–	8	–	3	–	–	–	9	–	4	–	–	–	–	–	–	17	2	13
11–12–16	4 p.m.	168	–	–	–	–	–	–	–	–	–	7	–	1	–	–	–	8	–	1	–	–	–	–	–	–	15	2	2
12–12–16	10 a.m.	186	–	–	–	–	–	–	–	–	–	7	–	–	–	–	–	4	–	4	–	–	–	–	–	–	11	2	4
12–12–16	4 p.m.	192	–	–	–	–	–	–	–	–	–	7	–	–	–	–	–	4	–	–	–	–	–	–	–	–	11	2	0
13–12–16	10 a.m.	210	–	–	–	–	–	–	–	–	–	6	–	1	–	–	–	1	–	3	–	–	–	–	–	–	7	2	4
13–12–16	4 p.m.	216	–	–	–	–	–	–	–	–	–	5	–	1	–	–	–	1	–	–	–	–	–	–	–	–	6	2	1
14–12–16	9 a.m.	233	–	–	–	–	–	–	–	–	–	3	–	2	–	–	–	1	–	–	–	–	–	–	–	–	4	2	2
14–12–16	4 p.m.	240	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	2	2	2
15–12–16	9 a.m.	257	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	2	2	0
15–12–16	4 p.m.	264	–	–	–	–	–	–	–	–	–	0	–	1	–	–	–	0	–	1	–	–	–	–	–	–	0	2	2

L = Living. M = Missing. D = Dead.

[1] This parasite turned up on 7–12–16. [2] One of these turned up next day. [3] This parasite was never found.

there, and this, with the remaining parasite in VI, was still alive at 257 hours ; both were dead, however, seven hours later.

This may be summarised as follows :—

I	Moist grass in cellar ..	all were dead in	$6\frac{3}{4}$	days.
II	Moist grass on lawn ..	„	„	$5\frac{3}{4}$	„
III	Dead leaves on soil on lawn	„	„	$2\frac{3}{4}$	„
IV	Dead leaves on soil in cellar	„	„	$11\frac{3}{4}$	„
V	Bare soil on lawn	„	„	$2\frac{3}{4}$	„
VI	Bare soil in cellar	„	„	11	„
VII	Wool in laboratory ..	„	„	$3\frac{3}{4}$	„
VIII	Wool in cellar	„	„	4	„

It is obvious that the *least* favourable conditions and location for the survival of these parasites of the sheep and without food, in these experiments, was the bare soil on the lawn exposed to the current conditions of weather ; the next was the dead leaves on soil on the lawn under similar conditions; next was the wool on the laboratory bench, where there were no extremes of temperature ; next was the wool in the cellar, the temperature here being lower uniformly than with the previous lot of parasites ; next was the moist grass on the lawn, where, although the parasites were subject to a wide range of temperature and weather they were supplied with moisture ; the next was the moist grass in the cellar ; the next was the bare soil in the cellar ; and the next—*i.e.*, the most favourable situation—the dead leaves on soil in the cellar. In these three last, under evidently the most favourable conditions, the one common condition was that of moderately cool, uniform temperature. Dryness is evidently more favourable to survival than moisture, and it is possible that a slight shelter given by the leaves may have been helpful, though it is difficult for us to think so, since the parasites were not particularly partial to the underside of the leaves, frequently rather the reverse. Exposed to direct sunlight, where the temperature on some days exceeds 90°, it is evident that the parasites require moisture.

Conclusions.

We do not feel justified in drawing extensive conclusions from this one set of experiments, but so far as they go they seem to show—

(1) That a moderately cool, uniform temperature is the most favourable condition for the persistence of the " tick " off the sheep and without food, especially if it be dry.

(2) If extremes of temperature be present then moisture is necessary, dryness soon proving fatal.

(3) The life of " ticks " in shed wool is short under uniform temperature whether cool or moderate.

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(4) The state of nutrition does not seem to have influenced the viability of these "ticks."

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Clinical Cases.

A CASE OF SPLENIC ABSCESS, SECONDARY TO INVASION OF THE STOMACH WALL OF A HORSE BY SPIROPTERA MEGASTOMA.

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Subject.—Grey gelding; seven years old.

History.—On December 14th, 1915, the horse was operated on for the removal of a "swamp cancer" from the inside of the near hind leg, between the hock and the fetlock. The cancer commenced to grow again a week after the operation, and ultimately became about three times the original size. On Tuesday, 28th, the patient was put on the iodide of potassium treatment, and was treated with this drug continuously, with the exception of one or two short breaks, up to the time of death.

The horse commenced to fall away in condition soon after being operated upon, though fed on good fodder, and on Monday, May 29th, 1916, he fell down, and was unable to rise without assistance. When once up he was able to support himself. For another week he continued in this condition, and on Tuesday, June 6th, he was found dead.

Throughout the course of treatment the horse gradually fell away in condition, but retained a good appetite up till the morning before he died. No symptoms of any kind were displayed, and the action of the bowels was regular; and the poor condition was put down to the effects of the cancer and the prolonged administration of the iodide, since cancerous horses become low in condition sooner or later.

Post-Mortem.—About two gallons of peritoneal fluid, slightly reddish in colour, was found when the abdominal cavity was opened.

The intestines were fairly empty, but were normal in themselves, and a large number of nematode worms (Strongylus spp.) were found in the cæcum.

The kidneys and liver were normal. The spleen was greatly enlarged, and had assumed an almost square shape. It measured

18 inches by 18, and was eight inches thick at its thickest part. It weighed 16 pounds. Numerous septic foci were scattered over the surface.

On section the pulp was dark red and congested, though not soft. Many septic foci were exposed, and a large abscess, surrounded by necrotic and putrid tissue, and about six inches in diameter, was found in the region where the spleen was attached to the greater curvature of the stomach. In the stomach wall were two or three small tumours, and one large one (six inches in diameter, and one and one-half to two inches thick) on the greater curvature at the splenic attachment. In the clefts of the tumour numerous small nematode worms (Spiroptera Megastoma) were found, and on section the tumour proved to be purulent in the centre due to a staphylococcic infection.

The occurrence of Spiroptera Megastoma in horses has been noted on various occasions, and this parasite has generally been mentioned in the annual reports of the Veterinary Department as being one of the more common endoparasites of the horse in the Northern Territory; but this is the first case that has come under the writer's notice in which a splenic abscess has been found as a secondary infection.

This record of the above case is of interest following the report in a previous Australian supplement of numerous cases of splenic abscess in Victoria. As the case is reported from the extreme northern part of Australia it is thus probable that the condition has a wide distribution in the continent.

CESARIAN SECTION ON A BRAHMIN HEIFER.

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At the Melbourne Zoological Gardens an endeavour has been made to obtain a hybrid by crossing a Brahmin heifer and a Bison bull, and success attended the attempts, inasmuch as the period of gestation was about completed, although the abdomen of the heifer appeared extremely distended when the signs of impending parturition were shown.

Straining and redness of the vulva continued for about four or five days, then commenced to pass off, when it was deemed advisable to interfere if the life of the calf was to be saved.

On examination it was found that the calf was not larger than usual, and that the distension of the abdomen was due, not to enlarged fœtus, but to hydrops amnii, with the ventral surface of the abdomen almost reaching the ground.

In the ordinary course of events, where the life of the mother is the most important consideration, delivery could have been most easily effected by dilatation of the cervix and rupture of the membranes. This we considered might prejudice the life of the calf if delivery

was not immediately effected, and as the life of the calf in this case was of more value than that of the mother, section of the uterus was the course decided upon.

The heifer was chloroformed, after being cast, the right flank being uppermost, and a wide area prepared for operation in the usual way. An incision about a foot in length was made in the right flank, following the direction of the fibres of the external oblique abdominal muscle, and a gridiron opening made through the remaining muscle strata, the peritoneum of necessity being opened along with the transverse muscle. This exposed the uterine walls, through which a small incision was made in an area devoid of cotyledons to release the amniotic fluid.

Many gallons of this was then run off, then the opening in the uterus increased in size, avoiding the cotyledons and controlling the bleeding from walls of the uterus by broad ligament forceps. The fœtus was grasped and withdrawn, the umbilical cord being ligatured in two places and divided.

One would have preferred to remove the whole of the placental tissue at the time of operation, but the prospect of stripping adherent placentæ from seventy or so cotyledons is not a hopeful one, with the chance of severe hemorrhage almost a certainty. The cut, ligatured end of the umbilicus was therefore returned to the cavity of the uterus and the opening closed, first by a layer of simple, continuous sutures, and this inverted by a strong, continuous sero-muscular stitch, thus closing the incision by the Czerny-Lembert method.

The peritoneum and muscle layers was then closed in the usual way and the edges of the skin approximated by silkworm gut. All the buried sutures were of chromicised No. 4 catgut.

No exudate collected in the wound and the external stitches were removed at the end of fourteen days. The removal of the membranes was a matter of greater difficulty, and though a portion of them were removed, at the end of a few days, *en masse*, the bulk of them came away slowly by decomposition, a process delayed by constant irrigation of the uterus with antiseptic solutions.

The case was instructive in showing that the membranes can be left in the uterus for the time being, and further that by inverting the edge of the wound as in bowel suture provisional union is strong enough to prevent leakage into the peritoneal cavity when decomposition of the membranes is set up.

(*End of Australian Supplement.*)